ISSN 0704-3716

Canadian Translation of Fisheries and Aquatic Sciences

No. 5538

# Prevention of vibriosis, furunculosis and redmouth disease in rainbow trout

J. L. Larsen

Original title: Forebyggelse af vibriose, furunkulose og rodmundsyge hos regnbueorred

In: Dan. Vet. Tidsskr./[Dan. Vet. J.] 71(13): 688-690, 1988.

Original language: Danish

Available from:
Canada Institute for Scientific and Technical Information
National Research Council
Ottawa, Ontario, Canada K1A 0S2

1991

9 typescript pages

Secretary of State / Secrétariat d'État

92-00827/

MULTILINGUAL SERVICES DIVISION – DIVISION DES SERVICES MULTILINGUES

TRANSLATION BUREAU BUREAU DES TRADUCTIONS

## LIBRARY IDENTIFICATION – FICHE SIGNALÉTIQUE

| Translated from - Traduction de | Into - En |
|---|---|
| Danish | English |

Author - Auteur

Jens Laurits LARSEN

Title in English or French - Titre anglais ou français

Prevention of vibriosis, furunculosis and redmouth disease in rainbow trout

Title in foreign language (Transliterate foreign characters)
Titre en langue étrangère (Transcrire en caractères romains)

Forebyggelse af vibriose, furunkulose og rodmundsyge hos regnbueorred

Reference in foreign language (Name of book or publication) in full, transliterate foreign characters.
Référence en langue étrangère (Nom du livre ou publication), au complet, transcrire en caractères romains.

Dansk Veterinaer Tidsskrift

Reference in English or French - Référence en anglais ou français

Danish Veterinary Journal

| Publisher - Éditeur | DATE OF PUBLICATION / DATE DE PUBLICATION | | | Page Numbers in original / Numéros des pages dans l'original |
|---|---|---|---|---|
| – | Year / Année | Volume | Issue No. / Numéro | 688–690 |
| Place of Publication / Lieu de publication | | | | Number of typed pages / Nombre de pages dactylographiées |
| Denmark | 1988 | 71 | 13 | 7 |

Requesting Department / Ministère-Client: DFO

Translation Bureau No. / Notre dossier nº: 3850546

Branch or Division / Direction ou Division: Scientific Pubs.

Translator (Initials) / Traducteur (initiales): LT

Person requesting / Demandé par: Dr. Derek Shaw
Northwest Atlantic Fisheries Centre
P.O. Box 5667, St. John's, Newfoundland A1C 5X1

Your Number / Votre dossier nº:

Date of Request / Date de la demande: 10.07.1991

Canada

SEC 5-111 (84-10)

Department of the Secretary of State of Canada / Secrétariat d'État du Canada

TRANSLATION LETTERHEAD - PAPIER À EN-TÊTE

MULTILINGUAL TRANSLATION DIRECTORATE
TRANSLATION BUREAU

DIRECTION DE LA TRADUCTION MULTILINGUE
BUREAU DE LA TRADUCTION

| Originator File No. - Référence du demandeur | Department - Ministère | Division/Branch - Division/Direction | City - Ville |
|---|---|---|---|
| | DFO | Scientific Pub. | |
| **Translation Request No. - N° de la demande de traduction** | **Language - Langue** | **Translator (initials) - Traducteur (initiales)** | |
| 3850546 | Danish | LT | AUG - 6 1991 |


# PREVENTION OF VIBRIOSIS, FURUNCULOSIS AND REDMOUTH DISEASE IN RAINBOW TROUT

UNEDITED TRANSLATION
For information only
TRADUCTION NON REVISEE
Information seulement

Dansk Vet. Tidsskr.
(Danish Veterinary Journal) 1988, 71, 13 1/7

Jens Laurits Larsen,
Lic. Vet. Med.

Institute of Veterinary Microbiology and Hygiene
The Royal Veterinary and Agricultural High School of Denmark

# PREVENTION OF VIBRIOSIS, FURUNCULOSIS AND REDMOUTH DISEASE IN RAINBOW TROUT

Bacterial diseases of the salmonid fishes constitute a great economic threat to the rapidly expanding aquaculture industry. Fish for stocking are raised in fresh water, where furunculosis *(Aeromonas salmonicida)* and redmouth disease *(Yersinia ruckeri)* may reach significant levels. After a disease passes, quite a significant number of the surviving fish remain symptomless carriers mainly responsible for the transmission of the disease. However, wild fish populations are a significant source of infection as well.

When fish for stocking are transferred to a marine environment, they are exposed to the *Vibrio* species living in that environment. *Vibrio anguillarum* and *Vibrio salmonicida* are significant in Scandinavia, while *Vibrio ordalii* is reported from North America and Japan. Thus, a producer can count on "purchasing" two diseases and obtaining one locally. The transportation of the fish to the stocking place as well as the osmotic

and temperature stresses are important stress factors promoting outbreaks of bacterial diseases. In Denmark, several sea farms have shown a characteristic disease pattern, with vibriosis occurring from May to July, after which furunculosis dominates, while redmouth disease occurs only sporadically.

Therefore, the producer has to live with a significant risk of bacterial disease outbreaks. The most rational preventive measure is vaccination. A number of factors favoring this measure can be mentioned:

1. The current expansion of the aquaculture industry results in a great need for fish for stocking, so that fish farmers frequently uncritically purchase mixtures of fish which have different immunological statuses and may also be disease carriers. This is contrary to one of the fundamental principles of preventive medicine. Vaccination can contribute greatly to improving immunological status with regard to bacterial diseases.

2. **Tebbitt et al.** (1981) documented that vaccination can reduce mortality by 84 % and medicine use by 77 %; at the same time feed ratio is improved by about 14 %.

3. If medication is preferred to vaccination, a given period of latency must be allowed to pass before treatment is started. A rise in mortality must be registered first, and in some cases feeding is reduced in such a case. If deaths continue, the disease must be diagnosed and medicated feed provided. During these periods, mortality will result in direct losses, and also indirect losses are possible due to pathological changes which

may influence slaughter quality. Medication may lead to other problems as well, such as residual antibiotics in fish and development of fish pathogens resistant to antibiotics.

4. Environmental organisations emphasize several risks connected with aquaculture. Many fish-pathogenic bacteria are not species-specific, which could constitute a danger for wild fish. Other problems pointed out include transmission of resistant fish-pathogenic bacteria and influence on surrounding microflora. Such problems could be eliminated by vaccination to a considerable extent.

**Choice of vaccines**

As pointed out in an earlier article about field trials of fish vaccines, published in Dansk Veterinaer Tidsskrift 1987, 70, 382-85, the present trend is toward combination vaccines.

For Danish producers, who face the risk of two or three diseases in a production period, only bi- or trivalent vaccines are of interest. Where vibriosis vaccine has been used, furunculosis outbreaks have shown that such a monovalent vaccine is of no interest. The Scandinavian vaccine producers have been concentrating up to now on vaccines against a single disease, for example vibriosis, Hitra disease, or redmouth disease, while North American companies are further advanced in the development of combination vaccines (Bullock & Andersson 1984).

**Vaccination trials in 1987**

In Denmark, fish for stocking usually weighs 700 - 900 g, and vaccination by injection is the only economical possibility. In the trial, vaccination was performed at the farms 3-4 weeks before transfer to sea water. Prior to vaccination, the fish were anaesthetized by dipping them for ½ - 1 min in water containing approx. 1 g/L chlorbutol. Injection was performed about 1 cm in front of the ventral fins by means of an automatic syringe equipped with a 23 G x 25 mm needle and a dose of 0.2 mL per fish. A special work counter with a comfortable height was constructed. Four persons were able to vaccinate 12 000 fishes a day.

Due to interest in a trivalent vaccine suitable for the Danish conditions, an experimental vaccine was developed (by Dr W.D. Paterson, Aqua Health Ltd, Canada) and tested in 1987. To gather more information, fish for stocking were vaccinated at three different sea farms by three different teams. Table 1 shows the results of the vaccination trial.

**Table 1 Effect of a trivalent vaccine for prevention of vibriosis, furunculosis and redmouth disease. Field trial 1987.**

| Farm | Vaccin. | No. of trouts | Mortality, no. | Mortality, % | Medication |
|---|---|---|---|---|---|
| 1 | + | 16 392 | 1 287 | 7.9 | - |
| | - | 9 489 | 1 409 | 14.9 | + |
| 2 | + | 9 657 | 134 | 1.4 | - |
| | - | 9 792 | 1 332 | 13.6 | + |
| 3 | + | 4 000 | 90 | 2.3 | - |
| | - | 4 000 | 546 | 13.7 | + |

At Farm No. 1, high water temperatures (up to 18° C) occurred in week 28-29, in which connection the bottom sediment was disturbed in this area, with a resulting mortality of 4-7 % of the whole population. These figures are included in the result. If the mortality in this period is not included, the total mortality for the vaccinated fish is 3.2 % and for the unvaccinated 7.1 %. Thus, the vaccinated fish tolerated this stress better, and it can also be expected that a number of the fish dying in this period died as a result of an infectious disease. Samples were submitted from 24 trouts from this period, out of which 10 were sterile and 14 had non-specific bacterial flora. Also, samples from Farms 1 and 3 were submitted in the production period for bacteriological examination. Vibriosis and furunculosis were verified in both localities, and infections were found only among unvaccinated fish. The owner of Farm No. 3 reported that furunculosis had been recorded on his fish farm.

## Discussion

In spite of the fact that the vaccines used in the trials do not meet the requirements outlined by Evelyn (1984) with respect to the antigenic composition of the local fish-pathogenic strains, the outcome was so favorable that the participating fish farmers wished to continue with the vaccination. Observations concerning appetite, feed consumption, etc, point to such good results that these details are going to be taken up for study in 1988.

The most interesting result is that protection against furunculosis was so surprisingly strong, as it was this component of the vaccine that was

the most doubtful. Furunculosis has been recorded on all 3 farms. As the material regarding the vaccinated fish, submitted in 1987, was very scarce, it is only the modest mortality of the vaccinated fish that indicates that the disease can be managed by preventive vaccination. Furthermore, it is reported that medicine was given to all groups of fish not vaccinated, which reduced the number of deaths in these groups, so that the differences were not as pronounced as they could have been otherwise.

Among the Vibrios, *Vibrio anguillarum* was the only one reported from the farms. Generally O1 strains from different countries are very homologous, and therefore, this component of the vaccine is fully in order. *Vibrio anguillarum* O2 isolates commonly constitute 15-20 % of the Scandinavian findings. It can be questioned whether *Vibrio ordalii*, included in the vaccine as O2 component, can cover the spectrum of *Vibrio anguillarum* O2 strains (**Rasmussen** 1987, **Svendsen & Larsen** 1988).

No conclusions were made about redmouth disease, as no outbreaks were observed. However, the pertinent vaccine component was used on fish ponds in Jutland with great success (**Horlyck & Kehlet** 1985). As several serotypes of *Yersinia ruckeri* now occur in Scandinavia, it would be important to verify whether this should influence the composition of the vaccines.

## Conclusion

The available experimental results show that essential infectious bacterial diseases in trout can be controlled with commercial vaccines. On the basis of knowledge of each country's disease spectrum and the existing serological variants of the different bacteria, such vaccines can probably be continuously improved to keep them parallel with the requirements regarding profitability of production. It is very important to have a well-functioning, advanced diagnostic service, because it is at the diagnostic level that the first changes in disease patterns and the verification of new disease causes are registered.

## Literature

1) Horlyck, V. & N.P. Kehlet. Clinical testing of vaccines against red mouth disease. Freskvandsfiskeribladet 1985, 83, 286-289.